

Remarks

The above Amendments and these Remarks are in reply to the Office Action mailed September 16, 2002. No fee is due for the addition of new claims. Reconsideration of the rejections and consideration of the newly-added claims is respectfully requested.

I. Objection to the claims

Claim 14 is objected to due to an alleged informality regarding improper grammar. Applicants respectfully disagree with the grammatical interpretation. The language to which the Examiner objected includes “heating the upper electrode to a temperature between about 300°C and about 500°C.” This uses the grammatical construct heating to a temperature between A and B, where A is about 300 °C and B is about 500 °C. The Examiner suggests that it would be more appropriate to recite heating to a temperature between A to B. Applicants respectfully submit that it would be appropriate to either recite between A and B, or from A to B, but not between A to B. Applicants therefore respectfully request that the objection with respect to claim 14 be withdrawn.

II. Rejection under 35 USC 102

a. JP 07-130712A (Keizo)

Claims 12-16, 19, 30-31, and 58-61 are rejected under 35 U.S.C. §102(b) as being anticipated by JP 07-130712A (*Keizo*). *Keizo* discloses heating a workpiece 6 by using an inner heater 3 provided in the board 2 supporting the workpiece 6. The heater in the board is used to control the heat of the workpiece to prevent contamination from collecting on the sidewalls (see Abstract). Claim 12 as amended recites “heating the upper electrode with said heater to a temperature such that any material resulting from the reaction deposited on the surface of the upper electrode forms a stable layer of material.” *Keizo* does not disclose such a limitation, and therefore cannot anticipate claim 12. Claims 13-16, 19, and 30-31 depend from claim 12 and therefore cannot be anticipated by *Keizo*.

Similarly, claim 58 has been amended to recite “heating an upper surface in the reactor chamber during the etch such that etch materials deposited on the surface form a stable layer of material that does not flake off onto the workpiece.” *Keizo* does not disclose such a limitation, and therefore cannot anticipate claim 58. Claims 59-61 depend from claim 58 and therefore cannot be anticipated by *Keizo*.

Applicants therefore respectfully request that the rejection with respect to claims 12-16, 19, 30-31, and 58-61 in view of *Keizo* be withdrawn.

b. *DeOrnellas*

Claims 12-16, 19, and 30-31 are rejected under 35 U.S.C. §102(e) as being anticipated by *DeOrnellas* (US 6,046,116). *DeOrnellas* discloses heating a chuck in order to heat a wafer, which “can be the result of, for example, a resistive heater 56 contained in the lower electrode” (col. 3, lines 49-54). As discussed above, claim 12 has been amended to recite “heating the upper electrode with said heater to a temperature such that any material resulting from the reaction deposited on the surface of the upper electrode forms a stable layer of material.” *DeOrnellas* does not disclose such a limitation, and therefore cannot anticipate claim 12. Claims 13-16, 19, and 30-31 depend from claim 12 and therefore cannot be anticipated by *DeOrnellas*. Applicants therefore respectfully request that the rejection with respect to claims 12-16, 19, and 30-31 in view of *DeOrnellas* be withdrawn.

C. *Kugo or Ohno*

Claims 58-59 are rejected under 35 U.S.C. §102(e) as being anticipated by *Kugo* (US 6,007,673) or *Ohno* (JJAP). Claim 58 has been amended to recite “heating an upper electrode and at least one upper surface in the reactor chamber during the etch such that etch materials deposited on the upper electrode and at least one upper surface form a stable layer of material that does not flake off onto the workpiece.” *Kugo* does not disclose such a limitation, but only recites “top heating walls 106a and 106b and bottom heating walls 107a and 107b” that “are provided on the side wall of the plasma creation room 101” (Fig. 10 and col. 1, lines 5-60). *Ohno* also fails to disclose “heating an upper electrode and at least one upper surface in the reactor chamber.” As such, claim 58 cannot be anticipated by either *Kugo* or *Ohno*. Claim

59 depends from claim 58 and is therefore also not anticipated. Applicants therefore respectfully request that the rejection with respect to claim 58 and 59 be withdrawn.

III. Rejection under 35 U.S.C. §103

Claim 56 is rejected under 35 U.S.C. §103(a) as being obvious over *Keizo* in view of *Ohmi* (US 5,272,417). As discussed above, claim 12 has been amended to recite the limitation of “heating the upper electrode with said heater to a temperature such that any material resulting from the reaction deposited on the surface of the upper electrode forms a stable layer of material.” Such a limitation is not taught or suggested by *Keizo* or *Ohmi*, either alone or in combination. As such, claim 12 cannot be rendered obvious by *Keizo* in view of *Ohmi*. As claim 56 depends from claim 12, neither is this claim rendered obvious. Applicants therefore respectfully request that the rejection with respect to claim 56 be withdrawn.

Claim 57 is rejected under 35 U.S.C. §103(a) as being obvious over *Ohno* in view of *Ohmi*. *Ohno* discloses heating and controlling the “upper electrode and etching electrode” and “heating a wafer to at least 250°” (abstract; page 1, col. 1). Claim 57 recites “heating the upper electrode with said heater to a temperature such that any material resulting from the reaction that is deposited on the surface of the upper electrode forms a stable layer of material.” *Ohno* does not teach or suggest that the temperature of the upper electrode is of any significance, does not teach or suggest electrode temperatures, and does not teach or suggest the formation of stable layers of material on the surface of the electrode. *Ohno* only teaches using heated electrodes to control the temperature of the wafer, in order to form protective films on the sidewalls of patterns on the wafer (abstract; page 1, col. 1). *Ohno* therefore does not teach or suggest “heating the upper electrode with said heater to a temperature such that any material resulting from the reaction that is deposited on the surface of the upper electrode forms a stable layer of material.”

Ohmi does not make up for the deficiencies in *Ohno*, as *Ohmi* also fails to teach or suggest “heating the upper electrode with said heater to a temperature such that any material resulting from the reaction that is deposited on the surface of the upper electrode forms a stable layer of material.” As such,

Ohmi and *Ohno* cannot render claim 57 obvious, either alone or in combination. Applicants therefore respectfully request that the rejection with respect to claim 57 be withdrawn.

IV. Double Patenting Rejection

Claims 12-16, 19, and 30-31 are rejected under the judicially-created doctrine of obviousness double-patenting as being unpatentable over claims 1-37 of *DeOrnellas*. As discussed above, claim 12 has been amended to recite “heating the upper electrode with said heater to a temperature such that any material resulting from the reaction deposited on the surface of the upper electrode forms a stable layer of material.” *DeOrnellas* does not teach or suggest such a limitation, and therefore cannot render claim 12 obvious. Claims 13-16, 19, and 30-31 depend from claim 12 and therefore cannot be rendered obvious by *DeOrnellas*. Applicants respectfully submit that the claims of *DeOrnellas* and the claims of the present invention are patentably distinct, and respectfully request that the double-patenting rejection be withdrawn.

V. Newly Added Claims

Claims 62-63 have been added to more particularly point out and distinctly claim the subject matter which Applicants regard as the invention. These claims are supported by the specification and do not add new matter to the disclosure. Applicants respectfully request that the Examiner consider the new claims.

VI. Conclusion

In light of the above, it is respectfully submitted that all of the claims now pending in the subject patent application should be allowable, and a Notice of Allowance is requested. The Examiner is respectfully requested to telephone the undersigned if he can assist in any way in expediting issuance of a patent.

The Commissioner is authorized to charge any underpayment or credit any overpayment to Deposit Account No. 06-1325 for any matter in connection with this response, including any fee for extension of time, which may be required.

Respectfully submitted,

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APPENDIX

In the Claims:

12. (Twice Amended) A method of operating a reactor which comprises a reactor chamber, an upper electrode, a heater that heats said upper electrode, and gas inlets and outlets, the method comprising:
introducing process gas into said reactor chamber; and
[providing power to said electrode in order to facilitate a reaction with said process gas and a workpiece contained in said reactor chamber; and]
heating the upper electrode with said heater to a temperature such that any material resulting from the reaction deposited on the surface of the upper electrode forms a stable layer of material.

13. (Once Amended) The method of claim 12 wherein said heating step includes:
heating the upper electrode to a temperature above a floating temperature that the upper electrode would otherwise attain during operation of the reactor without the heater.

14. (Twice Amended) The method of claim 12 wherein said heating step includes:
heating the upper electrode to a temperature between about 300°C and about 500°C.

19. (Once Amended) The method of claim 16 wherein oxygen and chlorine are present in the reactor, the method includes:
heating the upper electrode in order to cause deposits of oxygen and chlorine to de-absorb from the upper electrode in order to leave mostly platinum deposited on the electrode.

56. (Once Amended) The method of claim 12, wherein [the step of providing power provides power to an upper electrode.] the reactor further comprises at least one side electrode, the method further comprising:

heating the at least one side electrode such that any material resulting from the reaction deposited on the surface of the at least one side electrode forms a stable layer of material.

58. (Once Amended) A method for etching a workpiece in a reactor chamber, comprising:
etching a workpiece in the reactor chamber; and
heating [a] an upper electrode and at least one upper surface in the reactor chamber during the etch such that etch materials deposited on the upper electrode and at least one upper surface form a stable layer of material that does not flake off onto the workpiece.

59. (Once Amended) A method according to claim 58, wherein the step of heating [a surface] includes heating [a] an upper surface selected from [upper electrodes,] side electrodes, [deposition] electrode shields, and [chamber surfaces] walls of the reactor.

60. (Once Amended) A method according to claim 58, wherein the step of heating [a] an upper surface includes heating the upper surface until any gas collected on the upper surface de-absorbs from the upper surface.

61. (Once Amended) A method according to claim 58, wherein the step of heating [a] an upper surface includes heating the upper surface until any gas collected on the upper surface boils off the upper surface.

62. (New) The method of claim 12, wherein the reactor further comprises an electrode shield, the method further comprising:

heating the electrode shield such that any material resulting from the reaction deposited on the surface of the electrode shield forms a stable layer of material.

63. (New) The method of claim 12, further comprising:

heating a wall of the reactor such that any material resulting from the reaction deposited on the wall of the reactor forms a stable layer of material.